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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LUGO, DAVID B	

ART UNIT	PAPER NUMBER
2637	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/550,757	JAFFE ET AL.
	Examiner	Art Unit
	David B. Lugo	2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *30-36,38-46,48,49 and 60-67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *30-36,38-46,48,49 and 60-67* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 30-36, 39-46, 48, 49 and 60-67 have been considered but are moot in view of the new ground(s) of rejection. The added claim limitations are addressed in the rejection below.

Claim Objections

2. Claim 49 is objected to because of the following informalities:

Claim 49 recites that the coefficient ramping circuit is configured to define a portion of a DSL **transmitter**, which is inconsistent with claim 40, which recites that a **receiver** comprises the ramping circuit. This apparent contradiction should be resolved.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 30-36, 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langberg et al. U.S. Patent 6,243,425 in view of Takatori et al. U.S. Patent 5,581,585 and Gadot et al. U.S. Patent 5,513,216.

5. Regarding claim 30, Langberg et al. disclose a ramping circuit (converter 130) configured to receive equalizer coefficient values from a decision feedback filter (ISI filter 64) and determine a new set of precoder values for precoder 94 based on the received equalizer

coefficient values by slowly changing the current set of precoder values to the new set of values by periodically incrementing each current precoder value a small amount, and output information representative of the ramped output to the precoder, where as the precoder values are slowly updated, the decision feedback equalizer filter coefficients are reduced (see Fig. 6, col. 4, line 63 to col. 5, line 26).

6. Langberg et al. do not expressly disclose clamping the filter tap coefficients.

7. Takatori et al. disclose a limiter 360 for clamping filter coefficients to a maximum value (Fig. 3, col. 5, lines 1-24).

8. It would have been obvious to one of ordinary skill in the art to use clamped coefficients as taught by Takatori et al. in the filter system of Langberg et al. in order to ensure that the adaptive filter coefficients are maintained within acceptable values.

9. Langberg et al., while stating that the decision feedback equalizer coefficients are reduced as the precoder values are updated, do not expressly state that they will be at a corresponding final value of zero.

10. Gadot et al. disclose an transmission system where a transmitter precodes a transmission signal, and a receiver provides decision feedback equalization where during a retrain operation, as depicted in Figure 12, after transmitting DFE coefficients to the transmitter, the receiver resets the coefficients to zero in step 920 (col. 10, line 11) and does not adapt the coefficients until the transmitter 10 has completed the retrain (col. 10, lines 11-16), thus resulting in the feedback filter coefficients having a value of zero when the precoder coefficients have reached their final value.

11. It would have been obvious to one of ordinary skill in the art to reset the decision feedback coefficients to zero, as taught by Gadot et al., in the system of Langberg et al., in order

to allow adaptation to begin from an initial starting point as the precoder is now compensating for the channel conditions that were being compensated for by the previous DFE coefficients.

12. Regarding claim 31, Langberg et al. disclose that the current precoder values are slowly changed to the new set of precoder values by incrementing by a small amount (see col. 5, lines 13-17).

13. Regarding claim 32, Langberg et al. disclose that the current precoder values are incremented until they reach the calculated new set of precoder values (col. 6, lines 11-14).

14. Regarding claims 33-35, Langberg et al. disclose a ramping circuit that provides a ramped output varied over time from a first value to a second value, as described above, but do not expressly state whether the output is ramped linearly or non-linearly. However, one of ordinary skill in the art would recognize that the output in the ramping circuit of Langberg et al. must be ramped either linearly or non-linearly (i.e. exponentially). Selection of the ramping to be either linear or to exponential is deemed a design consideration that fails to patentably distinguish over the prior art of Langberg et al.

15. Regarding claim 36, the ramping circuit 130 receives the coefficients over channel 119.

16. Regarding claim 38, Langberg et al. in combination with Takatori et al. disclose a ramping circuit included in a transceiver as described above, and further teach that the ramping circuit 130 receives the coefficients over channel 119 used in a modem in a communications transceiver. Langberg et al. do not expressly state that the transceiver is a DSL transceiver. However, DSL transceivers are well known in the art. It would have been obvious to one of ordinary skill in the art to implement the ramping circuit of Langberg et al. in a DSL system to take advantage of the utilization of the existing telephone wiring used in DSL networks.

17. Regarding claim 39, Langberg et al. in combination with Takatori et al. disclose a ramping circuit as described above, and further teach that the ramping circuit 130 receives the coefficients over channel 119, and is considered to define part of the transmitter associated with the precoder. Langberg et al. do not expressly state that the transmitter is a DSL transmitter. However, DSL transmitters are well known in the art. It would have been obvious to one of ordinary skill in the art to implement the ramping circuit of Langberg et al. in a DSL system to take advantage of the utilization of the existing telephone wiring used in DSL networks.

18. Claims 40-46, 48, 49 and 60-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Langberg et al. in view of Morton et al., "Run-Time Precoder Updates for HDSL2", Takatori et al and Turner U.S. Patent 5,414,733.

19. Regarding claims 40 and 60, Langberg et al. disclose data communications equipment (DCE) 11 (see Fig. 5) comprising a receiver 16 having a DFE 35 (col. 5, lines 64-66), where DFE 35, shown in Figure 2, includes a feedforward filter 49 and a decision feedback filter (ISI filter 64) coupled to the feedforward filter, the DCE further comprising a transmitter 15 having a precoding system 120, which includes a precoder 94 and a ramping circuit (converter 130) as shown in Figure 6, wherein the ramping circuit receives equalizer coefficient values from a decision feedback filter from a remote transceiver and determines a new set of precoder values for precoder 94 by slowly changing the current set of precoder values to the new set of values by periodically incrementing each current precoder value a small amount, and outputs information representative of the ramped output to the precoder (see Fig. 6, col. 4, line 63 to col. 5, line 17).

20. Langberg et al. do not expressly disclose that the ramping circuit is included in the receiver and transmits information representative of the ramped output to a precoder of a remote transceiver via a communication channel.

21. Morton et al. disclose in Figure 1 (page 2), an adaptation algorithm included in part of a receiver for computing coefficients for the equalizer in the receiver and differential precoder coefficients and transmitting the precoder coefficients to a precoder of a remote transmitter.

22. It would have been obvious to one of ordinary skill in the art to incorporate the teaching of calculating precoder coefficients in an adaptation unit also used to calculate coefficients of an equalizer comprised in a receiver, and transmit those precoder update coefficients to a transmitter comprising the precoder, as suggested by Morton et al., in the device of Langberg et al. in order to reduce the bandwidth requirement as stated by Morton et al. in page 4, section 4.

23. In addition, Langberg et al. do not expressly disclose clamping the filter tap coefficients.

24. Takatori et al. disclose a limiter 360 for clamping filter coefficients to a maximum value (Fig. 3, col. 5, lines 1-24).

25. It would have been obvious to one of ordinary skill in the art to use clamped coefficients as taught by Takatori et al. in the filter system of Langberg et al. in order to ensure that the adaptive filter coefficients are maintained within acceptable values.

26. Further, Langberg et al. do not expressly disclose that the feedforward filter includes a plurality of taps, a reference tap located proximate a center position of the filter having a coefficient value greater than the coefficients of the other filter taps.

27. Turner discloses a decision feedback equalizer having a feedforward filter with a reference (cursor) tap a number K tap stages from the end of the filter, broadly considered to be

proximate a center position of the filter (Fig. 4), where the cursor tap is the tap with the largest coefficient (col. 6, line 63 to col. 7, line 4).

28. It would have been obvious to one of ordinary skill in the art to employ a feedforward filter as taught by Turner in the DFE of Langberg et al. for improved error rate performance, as stated by Turner in col. 14, lines 10-22.

29. Regarding claims 41 and 61, Langberg et al. disclose that the current precoder values are slowly changed to the new set of precoder values by incrementing by a small amount (see col. 5, lines 13-17, eq. 1 – col. 5, line 31).

30. Regarding claims 42 and 62, Langberg et al. disclose that the current precoder values are incremented until they reach the calculated new set of precoder values (col. 6, lines 11-14).

31. Regarding claims 43-45 and 63-65, Langberg et al. disclose a ramping circuit that provides a ramped output varied over time from a first value to a second value, as described above, but do not expressly state whether the output is ramped linearly or non-linearly. However, one of ordinary skill in the art would recognize that the output in the ramping circuit of Langberg et al. must be ramped either linearly or non-linearly (i.e. exponentially). Selection of the ramping to be either linear or to exponential is deemed a design consideration that fails to patentably distinguish over the prior art of Langberg et al.

32. Regarding claim 46, the ramping circuit 130 receives the coefficients over channel 119.

33. Regarding claims 48 and 66, Langberg et al. in combination with Morton et al. and Takatori et al. disclose a ramping circuit included in a receiver as described above, but do not expressly state that the receiver is a DSL receiver. However, DSL receivers are well known in the art (see Turner). It would have been obvious to one of ordinary skill in the art to implement

the ramping circuit of Langberg et al. in a DSL system to take advantage of the utilization of the existing telephone wiring used in DSL networks.

34. Regarding claims 49 and 67, Langberg et al. in combination with Morton et al. and Takatori et al. disclose a receiver included in a transceiver as described above, where in the combination, the ramping circuit transmits information representative of the ramped output to the precoder. Langberg et al. do not expressly state that the transceiver is a DSL transceiver. However, DSL transceivers are well known in the art (see Turner). It would have been obvious to one of ordinary skill in the art to implement the ramping circuit of Langberg et al. in a DSL system to take advantage of the utilization of the existing telephone wiring used in DSL networks.

Conclusion

35. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Park et al. U.S. Patent 6,257,751 disclose an equalizer having a reference tap value at the center tap position.

36. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David B. Lugo whose telephone number is 571-272-3043. The examiner can normally be reached on M-F; 9:30-6.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Lugo
3/10/05

KHAI TRAN
PRIMARY EXAMINER 3/15/05